5. Gas-stack valve *B* is opened. (This passes the gas trapped in the gas checker *K* to the flues and boiler, thence to the stack);
6. Gas-stack valve *G* is closed;
7. Air-inlet valve *E* is opened. (This admits air to the furnace);
8. Gas-inlet valve *H* is opened;
9. Air-stack valve *D* is opened;
10. Steam is turned on to the producers.

The important feature of this system of valve operation is the time interval between the opening of the gas and the air stack valves on the same side of the furnace. This interval must be sufficient to permit the inflammable gases in the gas checker to pass into the flues and to the stack before the air-stack valve is opened. In the plant where this system was introduced the number of explosions was reduced from about 40 per day to 4 in 411 reversals in a period of five clays.

Several other systems are in use, and in some installations the valves are. interconnected in sets which are operated simultaneously. Different arrangements of flues and different valves will require some modification of this system, the essential point being the interval between the opening of the gas-stack valve and the air-stack valve.

This sequence of valve operation will not eliminate explosions unless the valves and the flues are sufficiently tight to prevent any air entering the system while the gas trapped or pocketed in the checker chamber is passing to the stack.

FAULTY BOILER SETTINGS

Probably the most important portion of the waste-heat boiler installation is the arrangement of the boiler setting with regard to the manner in which the gases pass through it—that is, the baffling and the location of the gas inlet and outlet. The design of boiler settings and their baffling has been the subject of much

experimenting, but unfortunately most of these experiments have been made without any very clear conception of the action of the hot gases while flowing past cool metallic surfaces.

The ruling temperature in steam boilers is very low. For this